FBS04- Use of Alternate Light Source to Aid in Stain Identification

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1. Scope

1.1. This procedure is used to help locate possible stains of biological origin for additional testing and identification.

2. Background

2.1. To establish the practices for documenting the examination of evidence to conform to the requirements of the Department of Forensic Sciences (DFS) Forensic Science Laboratory (FSL) *Quality Assurance Manual*, the accreditation standards under ISO/IEC 17025:2005, and any supplemental standards.

2.2. An alternate light source (ALS) may be used to facilitate the visualization and detection of body fluids (e.g. saliva, semen, sweat or urine) on items of evidence. Upon illumination by the ALS at a specific wavelength, a biological stain may emit fluorescence which can be observed, marked and diagrammed. The stain can then be further characterized by using presumptive and/or confirmatory tests.

3. Safety

3.1. Wear personal protective equipment (e.g., lab coat, gloves, mask, eye protection), when carrying out standard operating procedures.

3.2. Read Material Safety Data Sheets to determine the safety hazards for chemicals and reagents used in the standard operating procedures.

3.3. Use alternate light source (ALS) instrumentation in a dark room.

3.4. Orange goggles must be worn when viewing items under ALS.

4. Materials Required

4.1. Alternate Light Source (ALS)

4.2. Orange Goggles

5. Standards and Controls

5.1. The Positive and Negative Controls are tested prior to daily use. These results will be recorded in casework documentation.

5.1.1. A known semen stain is tested as a Positive Control (FBR03). This control should exhibit a fluorescent glow when viewed under the ALS using the A450 (wavelength of 450 nm) with orange goggles.

5.1.2. A sterile, unstained piece of cotton sheeting is tested as a Negative Control. This control should not exhibit a fluorescent glow when viewed under the ALS using the A450 with orange goggles.

6. Calibration

6.1. Not applicable

7. Procedures

7.1. Turn on the main switch (fans, lamp, and power supply). Check that the fans are clear of any obstructions. (This can be done as a daily task at the beginning of each workday.)

7.2. Check to be certain that the filter is set on the white light setting. Darken the room completely.

7.3. Put on orange goggles.

7.4. Change the filter to A450 for screening items of evidence for biological fluids (e.g. saliva, semen, sweat, or urine). Vary the angle and distance of the light source to search the item for possible stains. (**Note:** To aid in visualization, different wavelengths may be used. If using a wavelength other than 450nm, QC the positive and negative controls at the alternative wavelength and document this information in the casework notes.)

7.5. Mark the fluorescent areas using tape, marker or some other identifier for further testing. Be aware that blood will not fluoresce, however, it may appear as a darker area when viewed under the A450.

7.6. When the examination is complete, change the filter back to the white light setting and turn off the main switch.

8. Sampling

8.1. Not applicable

9. Calculations

9.1. Not applicable

10. Uncertainty of Measurement

10.1. When quantitative results are obtained, and the significance of the value may impact the report, the uncertainty of measurement must be determined. The method used to determine the estimation of uncertainty can be found in the *FSL Quality Assurance Manual – Estimation of Uncertainty of Measurement (Section 5.4.6).*

11. Limitations

11.1. Do not restart the lamp when the bulb is hot. Wait for the bulb to cool before restarting the power supply.

11.2. It should be noted that there are a variety of body fluids and substances which also fluoresce under the alternate light source. This procedure is an effective tool for locating stains to be more thoroughly tested and either included or eliminated as possible sources of DNA.

12. Documentation

12.1. FBU Serology Examination Worksheets

12.2. Diagram / Photo Worksheets

12.3. FBU Report of Results

13. References

13.1. Baechtel, F. S. The Identification and Individualization of Semen Stains. In: Forensic Science Handbook. Vol. 2, R.R. Saferstein, ed. Prentice Hall, pp. 47-392, 1988.

13.2. ISA/SPEX, Mini-Crimescope Tunable Forensic Light Source Model MCS-400W Operation & Maintenance Instructions, Manual: #81025-FBI.

13.3. *Forensic Science Laboratory Quality Assurance Manual* (Current Version)

13.4. *FSL Departmental Operations Manuals* (Current Versions)

13.5. *FSL Laboratory Operations Manuals* (Current Versions)

13.6. FBR03 - Positive Control – Semen (Current Version)